Guide To Wireless Sensor Networks Computer Communications And Networks

A complete guide to the state of the art theoretical and manufacturing developments of body sensor network, design, and algorithms In Body Sensor Networking, Design, and Algorithms, professionals in the field of Biomedical Engineering and e-health get an in-depth look at advancements, changes, and developments. When it comes to advances in the industry, the text looks at cooperative networks, noninvasive and implantable sensor microelectronics, wireless sensor networks, platforms, and optimization—to name a few. Each chapter provides essential information needed to understand the current landscape of technology and mechanical developments. It covers subjects including Physiological Sensors, Sleep Stage Classification, Contactless Monitoring, and much more. Among the many topics covered, the text also includes additions such as: ? Over 120 figures, charts, and tables to assist with the understanding of complex topics ? Design examples and detailed experimental works ? A companion website featuring MATLAB and selected data sets Additionally, readers will learn about wearable and implantable devices, invasive and noninvasive monitoring, biocompatibility, and the tools and platforms for long-term, low-power deployment of wireless communications. It's an essential resource for understanding the applications and practical implementation of BSN when it comes to elderly care, how to manage patients with chronic illnesses and diseases, and use cases for rehabilitation.

This book offers an essential guide to Wireless Sensor Networks, IoT Security, Image Processing, Secure Information Systems, and Data Encryption. In addition, it introduces students and aspiring practitioners to the subject of destination marketing in a structured manner. It is chiefly intended for researcher students in the areas of Wireless Sensor Networks and Secure Data Communication (including image encryption, and intrusion detection systems), academics at universities and colleges, IT professionals, policymakers and legislators. Given its content, the book can be used as a reference text for both undergraduate and graduate studies, in courses on Wireless Sensor Networks, Secure Image Processing, and Data Encryption applications. The book is written in plain and easy-to-follow language and explains each main concept the first time it appears, helping readers with no prior background in the field. As such, it is a "must-read" guide to the subject matter.

Why should you adopt a Wireless sensor network framework? Do several people in different organizational units assist with the Wireless sensor network process? How do you mitigate Wireless sensor network risk? What are the key elements of your Wireless sensor network performance improvement system, including your evaluation, organizational learning, and innovation processes? What is the total cost related to deploying Wireless sensor network, including any consulting or professional services? Defining, designing, creating, and implementing a process to solve a challenge or meet an objective is the most valuable role... In EVERY group, company, organization and department. Unless you are talking a one-time, single-use project, there should be a process. Whether that process is managed and implemented by humans, AI, or a combination of the two, it needs to be designed by someone with a complex enough perspective to ask the right questions. Someone capable of asking the right questions and step back and say, 'What are we really trying to accomplish here? And is there a different way to look at it?' This Self-Assessment empowers people to do just that - whether their title is entrepreneur, manager, consultant, (Vice-)President, CxO etc... - they are the people who rule the future. They are the person who asks the right questions to make Wireless Sensor Network investments work better. This Wireless Sensor Network All-Inclusive Self-Assessment enables You to be that person. All the tools you need to an in-depth Wireless Sensor Network Self-Assessment. Featuring 955 new and updated case-based questions, organized into seven core areas of process design, this Self-Assessment will help you identify areas in which Wireless Sensor Network improvements can be made. In using the questions you will be better able to: - diagnose Wireless Sensor Network projects, initiatives, organizations, businesses and processes using accepted diagnostic standards and practices - implement evidence-based best practice strategies aligned with overall goals - integrate recent advances in Wireless Sensor Network and process design strategies into practice according to best practice guidelines Using a Self-Assessment tool known as the Wireless Sensor Network Scorecard, you will develop a clear picture of which Wireless Sensor Network areas need attention. Your purchase includes access details to the Wireless Sensor Network self-assessment dashboard download which gives you your dynamically prioritized projects-ready tool and shows your organization exactly what to do next. You will receive the following contents with New and Updated specific criteria: - The latest quick edition of the book in PDF - The latest complete edition of the book in PDF, which criteria correspond to the criteria in... - The Self-Assessment Excel Dashboard - Example pre-filled Self-Assessment Excel Dashboard to get familiar with results generation - In-depth and specific Wireless Sensor Network Checklists - Project management checklists and templates to assist with implementation INCLUDES LIFETIME SELF ASSESSMENT UPDATES Every self assessment comes with Lifetime Updates and Lifetime Free Updated Books. Lifetime Updates is an industry-first feature which allows you to receive verified self assessment updates, ensuring you always have the most accurate information at your fingertips.

With modern communication networks continuing to grow in traffic, size, complexity, and variety, control systems are critical to ensure quality and effectively manage network traffic. Providing a thorough and authoritative introduction, Wireless Ad hoc and Sensor Networks: Protocols, Performance, and Control examines the theory, architectures, and technologies needed to implement quality of service (QoS) in a wide variety of communication networks. Based on years of research and practical experience, this book examines the technical concepts underlying the design, implementation, research, and invention of both wired and wireless networks. The author builds a strong understanding of general concepts and common principles while also exploring issues that are specific to wired, cellular, wireless ad hoc, and

sensor networks. Beginning with an overview of networks and QoS control, he systematically explores timely areas such as Lyapunov analysis, congestion control of high-speed networks, admission control based on hybrid system theory, distributed power control of various network types, link state routing using QoS parameters, and predictive congestion control. The book also provides a framework for implementing QoS control using mote hardware. Providing a deeply detailed yet conveniently practical guide to QoS implementation, Wireless Ad hoc and Sensor Networks: Protocols, Performance, and Control is the perfect introduction for anyone new to the field as well as an ideal reference guide for seasoned network practitioners.

This brief provides an overview of recent developments in multi-hop routing protocols for Wireless Sensor Networks (WSNs). It introduces the various classifications of routing protocols and lists the pros and cons of each category, going beyond the conceptual overview of routing classifications offered in other books. Recently many researchers have proposed numerous multi-hop routing protocols and thereby created a need for a book that provides its readers with an up-to-date road map of this research paradigm. The authors present some of the most relevant results achieved by applying an algorithmic approach to the research on multi-hop routing protocols. The book covers measurements, experiences and lessons learned from the implementation of multi-hop communication prototypes. Furthermore, it describes future research challenges and as such serves as a useful guide for students and researchers alike.

Explore how to develop and implement wireless server networks (WSN) using Contiki-NG, branded as the operating system for the IoT. The book explains Contiki-NG's advantages in sensing, communication, and energy optimization and enables you to begin solving problems in automation with WSN. Practical Contiki-NG is a guide to getting started with Contiki-NG programming featuring projects that demonstrate a variety of applications. This book takes a practical and content-driven approach to the latest technologies, including Raspberry Pi, IoT and cloud servers. Readers will go through step-by-step guides and sample scenarios such as sensing, actuating, connectivity, building middleware, and utilizing IoT and cloud-based technologies. If you're looking to go from zero to hero in using Contiki-NG to build Wireless Sensor Network (WSN) applications then this is the book for you. What You'll Learn Prepare and set up Contiki-NG development Review the basics of the Contiki-NG platform to build Wireless Sensor Networks (WSN) Develop your own Contiki-NG program Perform sensing and actuating on the Contiki-NG platform Implement a middleware for Contiki-NG motes Build a simple IoT program using the Contiki-NG environment Who This Book Is For Developers, students, researchers and anyone who has an interest in Wireless Sensor Network (WSN).

This guide is intended to offer best practice guidance compiled from recent research and development from both industry and academia on the monitoring of civil engineering infrastructure with wireless sensor network technology. It is designed to provide a well-defined strategy for the implementation of WSNs in infrastructure and to make the decision-making process more effective by offering advice on good practice for data interpretation and information valuation for a variety of asset types. It will also offer advice on what to do with the data obtained, and then how to proceed upon the project completion, i.e. when the monitoring tasks are finished.

What sources do you use to gather information for a Wireless sensor networks study? Are you making progress, and are you making progress as Wireless sensor networks leaders? What Wireless sensor networks data should be managed? What does Wireless sensor networks success mean to the stakeholders? How do you measure improved Wireless sensor networks service perception, and satisfaction? Defining, designing, creating, and implementing a process to solve a challenge or meet an objective is the most valuable role... In EVERY group, company, organization and department. Unless you are talking a one-time, single-use project, there should be a process. Whether that process is managed and implemented by humans, AI, or a combination of the two, it needs to be designed by someone with a complex enough perspective to ask the right questions. Someone capable of asking the right questions and step back and say, 'What are we really trying to accomplish here? And is there a different way to look at it?' This Self-Assessment empowers people to do just that - whether their title is entrepreneur, manager, consultant, (Vice-)President, CxO etc... - they are the people who rule the future. They are the person who asks the right questions to make Wireless Sensor Networks investments work better. This Wireless Sensor Networks All-Inclusive Self-Assessment enables You to be that person. All the tools you need to an in-depth Wireless Sensor Networks Self-Assessment. Featuring 949 new and updated case-based questions, organized into seven core areas of process design, this Self-Assessment will help you identify areas in which Wireless Sensor Networks improvements can be made. In using the questions you will be better able to: - diagnose Wireless Sensor Networks projects, initiatives, organizations, businesses and processes using accepted diagnostic standards and practices - implement evidence-based best practice strategies aligned with overall goals - integrate recent advances in Wireless Sensor Networks and process design strategies into practice according to best practice guidelines Using a Self-Assessment tool known as the Wireless Sensor Networks Scorecard, you will develop a clear picture of which Wireless Sensor Networks areas need attention. Your purchase includes access details to the Wireless Sensor Networks self-assessment dashboard download which gives you your dynamically prioritized projects-ready tool and shows your organization exactly what to do next. You will receive the following contents with New and Updated specific criteria: - The latest quick edition of the book in PDF - The latest complete edition of the book in PDF, which criteria correspond to the criteria in... - The Self-Assessment Excel Dashboard - Example pre-filled Self-Assessment Excel Dashboard to get familiar with results generation - In-depth and specific Wireless Sensor Networks Checklists - Project management checklists and templates to assist with implementation INCLUDES LIFETIME SELF ASSESSMENT UPDATES Every self assessment comes with Lifetime Updates and Lifetime Free Updated Books. Lifetime Updates is an industry-first feature which allows you to receive verified self assessment updates, ensuring you always have the most accurate information at your fingertips.

A concise and clear guide to the concepts and applications of wireless sensor networks, ideal for students, practitioners and researchers. This book explores various challenging problems and applications areas of wireless sensor networks (WSNs), and identifies the current issues and future research challenges. Discussing the latest developments and advances, it covers all aspects of in WSNs, from architecture to protocols design, and from algorithm development to synchronization issues. As such the book is an essential reference resource for undergraduate and postgraduate students as well as scholars and academics working in the field.

In what ways are Wireless sensor networks vendors and us interacting to ensure safe and effective use? How do we promote understanding that opportunity for improvement is not criticism of the status quo, or the people who created the status quo? Is there a high likelihood that any recommendations will achieve their intended results? Do we know what we need to know about this topic? Risk factors: what are the characteristics of Wireless sensor networks that make it risky? This breakthrough Wireless sensor networks self-assessment will make you the principal Wireless sensor networks domain expert by revealing just what you need to know to be fluent and ready for any Wireless sensor

networks challenge. How do I reduce the effort in the Wireless sensor networks work to be done to get problems solved? How can I ensure that plans of action include every Wireless sensor networks task and that every Wireless sensor networks outcome is in place? How will I save time investigating strategic and tactical options and ensuring Wireless sensor networks costs are low? How can I deliver tailored Wireless sensor networks advice instantly with structured going-forward plans? There's no better guide through these mind-expanding questions than acclaimed best-selling author Gerard Blokdyk. Blokdyk ensures all Wireless sensor networks essentials are covered, from every angle: the Wireless sensor networks self-assessment shows succinctly and clearly that what needs to be clarified to organize the required activities and processes so that Wireless sensor networks outcomes are achieved. Contains extensive criteria grounded in past and current successful projects and activities by experienced Wireless sensor networks practitioners. Their mastery, combined with the easy elegance of the self-assessment, provides its superior value to you in knowing how to ensure the outcome of any efforts in Wireless sensor networks are maximized with professional results. Your purchase includes access details to the Wireless sensor networks self-assessment dashboard download which gives you your dynamically prioritized projects-ready tool and shows you exactly what to do next. Your exclusive instant access details can be found in your book. You will receive the following contents with New and Updated specific criteria: - The latest quick edition of the book in PDF - The latest complete edition of the book in PDF, which criteria correspond to the criteria in... - The Self-Assessment Excel Dashboard - Example pre-filled Self-Assessment Excel Dashboard to get familiar with results generation - In-depth and specific Wireless sensor networks Checklists - Project management checklists and templates to assist with implementation INCLUDES LIFETIME SELF ASSESSMENT UPDATES Every self assessment comes with Lifetime Updates and Lifetime Free Updated Books. Lifetime Updates is an industry-first feature which allows you to receive verified self assessment updates, ensuring you always have the most accurate information at your fingertips.

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Infrastructure for Homeland Security Environments Wireless Sensor Networks helps readers discover the emerging field of low-cost standards-based sensors that promise a high order of spatial and temporal resolution and accuracy in an ever-increasing universe of applications. It shares the latest advances in science and engineering paving the way towards a large plethora of new applications in such areas as infrastructure protection and security, healthcare, energy, food safety, RFID, ZigBee, and processing. Unlike other books on wireless sensor networks that focus on limited topics in the field, this book is a broad introduction that covers all the major technology, standards, and application topics. It contains everything readers need to know to enter this burgeoning field, including current applications and promising research and development; communication and networking protocols; middleware architecture for wireless sensor networks; and security and management. The straightforward and engaging writing style of this book makes even complex concepts and processes easy to follow and understand. In addition, it offers several features that help readers grasp the material and then apply their knowledge in designing their own wireless sensor network systems: * Examples illustrate how concepts are applied to the development and application of * wireless sensor networks * Detailed case studies set forth all the steps of design and implementation needed to solve real-world problems * Chapter conclusions that serve as an excellent review by stressing the chapter's key concepts * References in each chapter guide readers to in-depth discussions of individual topics This book is ideal for networking designers and engineers who want to fully exploit this new technology and for government employees who are concerned about homeland security. With its examples, it is appropriate for use as a coursebook for upper-level undergraduates and graduate students.

When choosing the technology options to develop a wireless sensor network (WSN), it is vital that their performance levels can be assessed for the type of application intended. This book describes the different technology options – MAC protocols, routing protocols, localisation and data fusion techniques – and provides the means to numerically measure their performance, whether by simulation, mathematical models or experimental test beds. Case studies, based on the authors' direct experience of implementing wireless sensor networks, describe the design methodology and the type of measurements used, together with samples of the performance measurements attained. The book will enable you to answer vital questions such as: * How long will my network remain alive given the amount of sensing required of it? * For how long should I set the sleeping state of my motes? * How many sensors should I distribute to meet the expected requirements of the application? * What type of throughput should I expect as a function of the number of nodes deployed and the radio interface chosen (whether it be Bluetooth or Zigbee)? * How is the Packet Error Rate of my Zigbee motes affected by the selection of adjacent frequency sub bands in the ISM 2.4GHz band? * How is the localisation precision dependant on the number of nodes deployed in a corridor? Communications and signal processing engineers, researchers and graduate students working in wireless sensor networks will find this book an invaluable practical guide to this important technology. "This book gives a proper balance between theory and application; it is a book for those R&D engineers that want to appreciate both why, how and in which domains Wireless Sensor Networks can be best applied." - Fabio Bellifemine, Telecom Italia "This book is a thorough and accessible exposition on wireless sensor networks with a good balance between theory and practice; it is valuable for both students and practicing engineers, and is an essential addition for engineering libraries." - Professor Moe Win, Associate Professor at the Laboratory for Information and Decision Systems (LIDS), Massachusetts Institute of Technology *Only book to examine wireless sensor network technologies and assess their performance capabilities against possible applications *Enables the engineer to choose the technology that will give the best performance for the intended application *Case studies, based on the authors' direct experience of implementing wireless sensor networks, describe the design methodology and the type of measurements used, together with samples of the performance measurements attained

This book provides comprehensive coverage of the major aspects in designing, implementing, and deploying wireless sensor networks by discussing present research on WSNs and their applications in various disciplines. It familiarizes readers with the current state of WSNs and how such networks can be improved to achieve effectiveness and efficiency. It starts with a detailed introduction of wireless sensor networks and their applications and proceeds with layered architecture of WSNs. It also addresses prominent issues such as mobility, heterogeneity, fault-tolerance, intermittent connectivity, and cross layer optimization along with

a number of existing solutions to stimulate future research.

This book presents an in-depth study on the recent advances in Wireless Sensor Networks (WSNs). The authors describe the existing WSN applications and discuss the research efforts being undertaken in this field. Theoretical analysis and factors influencing protocol design are also highlighted. The authors explore state-of-the-art protocols for WSN protocol stack in transport, routing, data link, and physical layers. Moreover, the synchronization and localization problems in WSNs are investigated along with existing solutions. Furthermore, cross-layer solutions are described. Finally, developing areas of WSNs including sensor-actor networks, multimedia sensor networks, and WSN applications in underwater and underground environments are explored. The book is written in an accessible, textbook style, and includes problems and solutions to assist learning. Key Features: The ultimate guide to recent advances and research into WSNs Discusses the most important problems and issues that arise when programming and designing WSN systems Shows why the unique features of WSNs – self-organization, cooperation, correlation -- will enable new applications that will provide the end user with intelligence and a better understanding of the environment Provides an overview of the existing evaluation approaches for WSNs including physical testbeds and software simulation environments Includes examples and learning exercises with a solutions manual; supplemented by an accompanying website containing PPT-slides. Wireless Sensor Networks is an essential textbook for advanced students on courses in wireless communications, networking and computer science. It will also be of interest to researchers, system and chip designers, network planners, technical mangers and other professionals in these fields.

Can you implement the associated mission as a satellite sensor network? Do you plan to use the data from the sensor network for regulatory purposes? How do you turn the massive amounts of unstructured data that are generated by sensor networks into usable knowledge that makes companies more efficient? Do you plug wireless sensor network to cloud? How would one provide adequate notice for every embedded sensor network? Defining, designing, creating, and implementing a process to solve a challenge or meet an objective is the most valuable role... In EVERY group, company, organization and department. Unless you are talking a one-time, single-use project, there should be a process. Whether that process is managed and implemented by humans, AI, or a combination of the two, it needs to be designed by someone with a complex enough perspective to ask the right questions. Someone capable of asking the right questions and step back and say, 'What are we really trying to accomplish here? And is there a different way to look at it?' This Self-Assessment empowers people to do just that - whether their title is entrepreneur, manager, consultant, (Vice-)President, CxO etc... - they are the people who rule the future. They are the person who asks the right questions to make Sensor Network investments work better. This Sensor Network All-Inclusive Self-Assessment enables You to be that person. All the tools you need to an in-depth Sensor Network Self-Assessment. Featuring 946 new and updated case-based questions, organized into seven core areas of process design, this Self-Assessment will help you identify areas in which Sensor Network improvements can be made. In using the questions you will be better able to: - diagnose Sensor Network projects, initiatives, organizations, businesses and processes using accepted diagnostic standards and practices - implement evidence-based best practice strategies aligned with overall goals - integrate recent advances in Sensor Network and process design strategies into practice according to best practice guidelines Using a Self-Assessment tool known as the Sensor Network Scorecard, you will develop a clear picture of which Sensor Network areas need attention. Your purchase includes access details to the Sensor Network self-assessment dashboard download which gives you your dynamically prioritized projects-ready tool and shows your organization exactly what to do next. You will receive the following contents with New and Updated specific criteria: - The latest quick edition of the book in PDF - The latest complete edition of the book in PDF, which criteria correspond to the criteria in... - The Self-Assessment Excel Dashboard - Example pre-filled Self-Assessment Excel Dashboard to get familiar with results generation - In-depth and specific Sensor Network Checklists - Project management checklists and templates to assist with implementation INCLUDES LIFETIME SELF ASSESSMENT UPDATES Every self assessment comes with Lifetime Updates and Lifetime Free Updated Books. Lifetime Updates is an industry-first feature which allows you to receive verified self assessment updates, ensuring you always have the most accurate information at your fingertips.

Sensors & Signals is the 1st book from the Book Series of the same name published by IFSA Publishing. The book contains 8 chapters written by authors from universities and research centers from 12 countries. The coverage includes most recent developments in: Virtual instrumentation for analysis of ultrasonic signals; Humidity sensors (materials, preparation and characteristics); Fault tolerance and fault management issues in Wireless Sensor Networks; Localization of target nodes in a 3-D Wireless Sensor Network; Opto-elastography imaging technique for tumor localization and characterization; Nuclear and geophysical sensors for landmines detection; Optimal color space for human skin detection at image recognition; Design of narrowband substrate integrated waveguide bandpass filters. With its distinguished editors and international team of contributors Sensors & Signals is suitable for academic and industrial research scientists, engineers as well as PhD students."

This book emphasizes the increasingly important role that Computational Intelligence (CI) methods are playing in solving a myriad of entangled Wireless Sensor Networks (WSN) related problems. The book serves as a guide for surveying several state-of-the-art WSN scenarios in which CI approaches have been employed. The reader finds in this book how CI has contributed to solve a wide range of challenging problems, ranging from balancing the cost and accuracy of heterogeneous sensor deployments to recovering from real-time sensor failures to detecting attacks launched by malicious sensor nodes and enacting CI-based security schemes. Network managers, industry experts, academicians and practitioners alike (mostly in computer engineering, computer science or applied mathematics) benefit from th e spectrum of successful applications reported in this book. Senior undergraduate or graduate students may discover in this book some problems well suited for their own research endeavors.

Learn to run your own simulation by working with model analysis, mathematical background, simulation output data, and most importantly, a network simulator for wireless technology. This book introduces the best practices of simulator use, the techniques for analyzing simulations with artificial agents and the integration with other technologies such as Power Line Communications (PLC). Network simulation is a key technique used to test the future behavior of a network. It's a vital development component for the development of 5G, IoT, wireless sensor networks, and many more. This book explains the scope and evolution of the technology that has led to the development of dynamic systems such as Internet of Things and fog computing. You'll focus on the ad hoc networks with stochastic behavior and dynamic nature, and the ns-3 simulator. These are useful open source tools for academics, researchers, students and engineers to deploy telecommunications experiments, proofs and new scenarios with a high degree of similarity with reality. You'll also benefit from a detailed explanation of the examples and the theoretical components needed to deploy wireless simulations or wired, if necessary. What You'll Learn Review best practices of simulator uses

Understand techniques for analyzing simulations with artificial agents Apply simulation techniques and experiment design Program on ns-3 simulator Analyze simulation results Create new modules or protocols for wired and wireless networks Who This Book Is For Undergraduate and postgraduate students, researchers and professors interested in network simulations. This book also includes theoretical components about simulation, which are useful for those interested in discrete event simulation DES, general theory of simulation, wireless simulation and ns-3 simulator.

Wireless Sensor Networks is an essential guide for anyone interested in wireless communications for sensor networks, home networking, or device hacking.It covers a large number of topics encountered in the architecture, application, and recent advancements of a wireless sensor network, including hardware and software architectures, the Internet of Things, routing and security, MANETs, MEMS, Zigbee, TDMA, securing networks for Wi-Fi, ubiquitous sensor networks, underwater, mobile, and multimedia wireless networks. Features: * Includes a wide range of applications to industry, science, transportation, civil infrastructure, and security * Covers the Internet of Things (IoT), MEMS, Zigbee, TDMA, mobile wireless networks, and more * Features article on securing networks for Wi-Fi by the United States Department of Homeland Security (DHS) Cybersecurity Engineering

This book is a compilation of topics related to wireless sensor networks, wireless architecture and protocols, their applications, etc. It provides a detailed overview of the present status of WSNs. Some of the chapters included herein provide significant information on topics like power efficiency and energy consumption in wireless sensor networks, designing architecture for wireless sensor networks, routing protocols for WSNs, etc. It is an essential guide for students and academicians engaged in this field.

The best-selling Distributed Sensor Networks became the definitive guide to understanding this far-reaching technology. Preserving the excellence and accessibility of its predecessor, Distributed Sensor Networks, Second Edition once again provides all the fundamentals and applications in one complete, self-contained source. Ideal as a tutorial for students or as research material for engineers, the book gives readers up-to-date, practical insight on all aspects of the field. Revised and expanded, this second edition incorporates contributions from many veterans of the DARPA ISO SENSIT program as well as new material from distinguished researchers in the field. Sensor Networking and Applications focuses on sensor deployment and networking, adaptive tasking, self-configuration, and system control. In the expanded applications section, the book draws on the insight of practitioners in the field. Readers of this book may also be interested in Distributed Sensor Networks, Second Edition: Image and Sensor Signal Processing (ISBN: 9781439862827).

Learn all you need to know about wireless sensor networks! Protocols and Architectures for Wireless Sensor Networks provides a thorough description of the nuts and bolts of wireless sensor networks. The authors give an overview of the state-of-the-art, putting all the individual solutions into perspective with one and other. Numerous practical examples, case studies and illustrations demonstrate the theory, techniques and results presented. The clear chapter structure, listing learning objectives, outline and summarizing key points, help guide the reader expertly through the material. Protocols and Architectures for Wireless Sensor Networks: Covers architecture and communications protocols in detail with practical implementation examples and case studies. Provides an understanding of mutual relationships and dependencies between different protocols and architectural decisions. Offers an in-depth investigation of relevant protocol mechanisms. Shows which protocols are suitable for which tasks within a wireless sensor network and in which circumstances they perform efficiently. Features an extensive website with the bibliography, PowerPoint slides, additional exercises and worked solutions. This text provides academic researchers, graduate students in computer science, computer engineering, and electrical engineering, as well as practitioners in industry and research engineers with an understanding of the specific design challenges and solutions for wireless sensor networks. Check out www.wiley.com/go/wsn for accompanying course material! "I am deeply impressed by the book of Karl & Willig. It is by far the most complete source for wireless sensor networks...The book covers almost all topics related to sensor networks, gives an amazing number of references, and, thus, is the perfect source for students, teachers, and researchers. Throughout the book the reader will find high quality text, figures, formulas, comparisons etc. - all you need for a sound basis to start sensor network research." Prof. Jochen Schiller, Institute of Computer Science, Freie Universität Berlin

"This book provides a central source of reference on visual information processing in wireless sensor network environments and its technology, application, and society issues"--

Guide to Wireless Sensor NetworksSpringer Science & Business Media

Get ready to create distributed sensor systems and intelligent interactive devices using the ZigBee wireless networking protocol and Series 2 XBee radios. By the time you're halfway through this fast-paced, hands-on guide, you'll have built a series of useful projects, including a complete ZigBee wireless network that delivers remotely sensed data. Radio networking is creating revolutions in volcano monitoring, performance art, clean energy, and consumer electronics. As you follow the examples in each chapter, you'll learn how to tackle inspiring projects of your own. This practical guide is ideal for inventors, hackers, crafters, students, hobbyists, and scientists. Investigate an assortment of practical and intriguing project ideas Prep your ZigBee toolbox with an extensive shopping list of parts and programs Create a simple, working ZigBee network with XBee radios in less than two hours -- for under $100 Use the Arduino open source electronics prototyping platform to build a series of increasingly complex projects Get familiar with XBee's API mode for creating sensor networks Build fully scalable sensing and actuation systems with inexpensive components Learn about power management, source routing, and other XBee technical nuances Make gateways that connect with neighboring networks, including the Internet

Overview and Goals Wireless communication technologies are undergoing rapid advancements. The last few years have experienced a steep growth in research in the area of wireless sensor networks (WSNs). In WSNs, communication takes place with the help of spatially distributedautonomoussensornodesequippedtosensespeci?cinformation. WSNs, especially the ones that have gained much popularity in the recent years, are, ty- cally, ad hoc in nature and they inherit many characteristics/features of wireless ad hoc networks such as the ability for infrastructure-less setup, minimal or no reliance on network planning, and the ability of the nodes to self-organize and self-con?gure without the involvement of a centralized network manager, router, access point, or a switch. These features help to set up WSNs fast in situations where there is no existing network setup or in times when setting up a ?xed infrastructure network is considered infeasible, for example, in times of emergency or during relief - erations. WSNs ?nd a variety of applications in both the military and the civilian population worldwide such as in cases of enemy intrusion in the battle?eld, object tracking, habitat monitoring, patient monitoring, ?re detection, and so on. Even though sensor networks have emerged to be attractive and they hold great promises for our future, there are several challenges that need to be addressed. Some of the well-known challenges are attributed to issues relating to coverage and deployment, scalability, quality-of-service, size, computational power, energy ef?ciency, and security.

This SpringerBrief provides a concise guide to applying wireless energy transfer techniques in traditional battery-powered sensor networks. It examines the benefits and challenges of wireless power including efficiency and reliability. The authors build a wireless rechargeable sensor networks from scratch and aim to provide perpetual network operation. Chapters cover a wide range of topics from the collection of energy information and recharge scheduling to joint design with typical sensing applications such as data gathering. Problems are approached using a natural combination of probability theory, optimization, algorithm and protocol designs. All proposed mechanisms are evaluated by extensive simulations. Wireless Rechargeable Sensor Networks targets professionals and researchers working in networks, wireless communications, energy technology and information technology. Advanced-level students studying electrical engineering and computer science will also find this material useful as a study guide.

This book provides an in-depth guide to security in wireless ad hoc and sensor networks Security in Wireless Ad Hoc and Sensor Networks introduces the reader to the fundamentals and key issues related to wireless ad hoc networking, with an emphasis on security. It discusses the security attacks and counter measures in wireless ad hoc, sensor and mesh networks, and briefly presents the standards on related topics. The authors offer a clear exposition of various challenges and solutions in this field including bootstrapping, key distribution and exchange, authentication issues, privacy, anonymity and tamper resilience. Key Features: Introduces the fundamentals and key issues of the new technologies followed by comprehensive presentation on security attacks and counter measures Covers Denial of Service (DoS) attacks, hardware aspects of secure wireless ad hoc and sensor networks and secure routing Contains information on cryptographic primitives and electronic warfare Includes problems at the end of each chapter to enhance learning. This book is well suited for graduate students in computer, electrical and communications engineering and computer science departments, researchers in academia and industry, as well as C4I engineers and officers in the military. Wireless network designers for internet service providers and mobile communications operators will also find this book very useful.

Finally a book on Wireless Sensor Networks that covers real world applications and contains practical advice! Kuorilehto et al. have written the first practical guide to wireless sensor networks. The authors draw on their experience in the development and field-testing of autonomous wireless sensor networks (WSNs) to offer a comprehensive reference on fundamentals, practical matters, limitations and solutions of this fast moving research area. Ultra Low Energy Wireless Sensor Networks in Practice: Explains the essential problems and issues in real wireless sensor networks, and analyzes the most promising solutions. Provides a comprehensive guide to applications, functionality, protocols, and algorithms for WSNs. Offers practical experiences from new applications and their field-testing, including several deployed networks. Includes simulations and physical measurements for energy consumption, bit rate, latency, memory, and lifetime. Covers embedded resource-limited operating systems, middleware and application software. Ultra Low Energy Wireless Sensor Networks in Practice will prove essential reading for Research Scientists, advanced students in Networking, Electrical Engineering and Computer Science as well as Product Managers and Design Engineers.

This brief covers the emerging area of wireless sensor network (WSN)-based structural health monitoring (SHM) systems, and introduces the authors' WSN-based platform called SenetSHM. It helps the reader differentiate specific requirements of SHM applications from other traditional WSN applications, and demonstrates how these requirements are addressed by using a series of systematic approaches. The brief serves as a practical guide, explaining both the state-of-the-art technologies in domain-specific applications of WSNs, as well as the methodologies used to address the specific requirements for a WSN application. In particular, the brief offers instruction for problem formulation and problem solving based on the authors' own experiences implementing SenetSHM. Seven concise chapters cover the development of hardware and software design of SenetSHM, as well as in-field experiments conducted while testing the platform. The brief's exploration of the SenetSHM platform is a valuable feature for civil engineers designing their own similar SHM products, and the various concrete examples of problem formulation and algorithm design will make this an essential read for practitioners, researchers and students alike.

An up-to-date account of the way in which recent government initiatives, including the 1986 Act, will affect accountability and the quest for greater partnership between schools and parents.

Begin solving problems in automation using Wireless Sensor Networks (WSN). TinyOS is just one of the many wireless sensor network platforms used to implement applications and provides more advantages in sensing, communication and energy optimization. In this book, readers will explore how to develop and implement these networks using TinyOS. Practical TinyOS: Programming for Wireless Sensor Networks is a quick guide to getting started with TinyOS programming, with projects demonstrating a variety of applications. This book includes a practical and content-driven approach to the latest technologies, including Raspberry Pi, IoT, and Cloud Servers. Readers will go through step-by-step guides and sample scenarios such as sensing, actuating, connectivity, building middleware, and utilizing IoT and clouds-based technologies. What You'll Learn: How to prepare and set up TinyOS development The basics of using the TinyOS platform to build Wireless Sensor Networks How to develop TinyOS programs How to perform sensing and actuating on the TinyOS platform How to implement middleware for TinyOS motes How to build a simple IoT program for the TinyOS environment Who This Book Is For:This book is intended for developers, students, researchers and anyone who is interested in wireless sensor networks.